

5.5 Notes: **Ex. 7** $v(t) = t \ln t - t$

a) Find $a(t)$ *product rule

$$v(t) = \overset{f}{t} \overset{g}{\ln t} - t$$

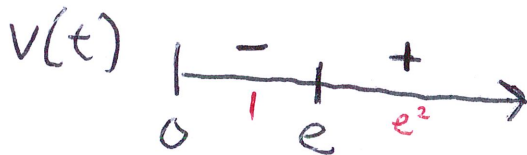
$$a(t) = \overset{f'}{(1)} \overset{g}{(\ln t)} + \overset{f}{(t)} \overset{g'}{\left(\frac{1}{t}\right)} - 1 = \ln t + 1 - 1 = \ln t$$

$$\boxed{a(t) = \ln t}$$

Find values of t where particle is moving right

b) Find critical points: set $v(t) = 0$, velocity sign line

$$v(t) = t \ln t - t \quad \left| \quad \begin{array}{l} t=0 \\ \boxed{t=0} \end{array} \right. \quad \left| \quad \begin{array}{l} \ln t - 1 = 0 \\ \ln t = 1 \\ \log_e t = 1 \end{array} \right. \quad \left| \quad \begin{array}{l} e^1 = t \\ \boxed{t=e} \end{array} \right.$$



particle moving right (e, ∞)
b/c $v(t) > 0$

c) Find minimum velocity

* this is where $a(t)$ changes from - to +

* create sign line for $a(t)$

$$a(t) = \ln t$$

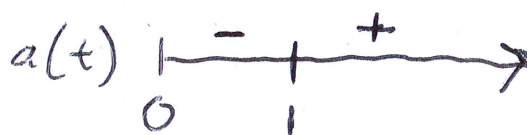
$$0 = \ln t$$

$$\ln t = 0$$

$$\log_e t = 0$$

$$e^0 = t$$

$$\boxed{t=1}$$



Minimum velocity occurs at $t=1$ since $a(t)$ changes from - to +

$$v(1) = (1) \ln(1) - 1 = -1$$

Minimum velocity is -1